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| 10/507,011 | 09/08/2004 | Minoru Niigaki | 046124-5316 | 6551 |
| 55694 | 7590 | 06/09/2006 | EXAMINER | |
| DRINKER BIDDLE & REATH (DC) | | | TRAN, THUY V | |
| 1500 K STREET, N.W. | | | ART UNIT | |
| SUITE 1100 | | | PAPER NUMBER | |
| WASHINGTON, DC 20005-1209 | | | 2821 | |

DATE MAILED: 06/09/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

H.A

Office Action Summary

Application No.

10/507,011

Applicant(s)

NIIGAKI ET AL.

Examiner

Thuy V. Tran

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 03 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on amendment submitted on 03/29/2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 March 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

This is a response to the Applicants' amendment submitted on March 29, 2006. In virtue of this amendment, claims 1-13 were originally filed; claim 14 is newly added; and thus, claims 1-14 are now presented in the instant application.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

*A person shall be entitled to a patent unless –
(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.*

2. Claims 1-10 and 14 are rejected under 35 U.S.C. 102(b) as being anticipated by Niigaki et al. (U.S. Patent No. 5,982,094).

With respect to claim 1, Niigaki et al. discloses, in Fig. 7, a transmission secondary electron emitter which emits secondary electrons [e-] generated by the incidence of primary electrons (which are emitted from a photocathode [30] by the incident of light [hv]; see Fig. 7); the transmission secondary electron emitter comprising (1) a secondary electron emitting layer [30] (or photocathode layer [30]) which is made of diamond or a material containing diamond as a main component (see col. 7, line 55), and of which one surface is the surface of incidence for making the primary electron incident thereon, and the other surface is the surface of emission for emitting the secondary electrons (see Fig. 7), and (2) a voltage applying means for applying a predetermined voltage (which is a positive voltage; see col. 7, lines 17-20) between the surfaces of the incidence and the emission of the secondary electron emitting layer [30] to inherently form an electric field in the secondary electron emitting layer (by force of the voltage applied).

With respect to claim 2, Niigaki et al. discloses, in Fig. 7, that the emitter further comprising a supporting means (which is ends of housing [20]; see Fig. 7; col. 7, lines 13-16) for reinforcing the mechanical strength of the secondary electron emitting layer [30].

With respect to claim 3, Niigaki et al. discloses that the secondary electron emitting layer [30] is made of polycrystalline diamond or a material containing polycrystalline diamond as a main component (see col. 7, line 8; col. 8, lines 2-3).

With respect to claim 4, Niigaki et al. discloses that the surface and the grain boundary face of the polycrystalline diamond of the secondary electron emitting layer [30] are terminated with oxygen (see col. 20, line 64 – col. 21, line 1).

With respect to claim 5, Niigaki et al. discloses that the surface of the emission of the secondary electron emitting layer [30] is terminated with hydrogen [32] (see Fig. 7; col. 8, lines 1-3).

With respect to claim 6, Niigaki et al. discloses that the surface of the emission of the secondary electron emitting layer [30] is terminated with oxygen (see col. 20, line 64 – col. 21, line 1).

With respect to claim 7, Niigaki et al. discloses, in Fig. 7, an active layer [32] for lowering the work function (see col. 7, lines 48-52) of the secondary electron emitting layer [30] is formed on the surface of the emission of the secondary electron emitting layer [30].

With respect to claim 8, Niigaki et al. discloses that the active layer [32] of the secondary electron emitting layer [30] comprises an alkali metal, an oxide of the alkali metal, or a fluoride of the alkali metal (see col. 20, line 64 – col. 21, line 2).

With respect to claim 9, Niigaki et al. discloses, in Fig. 7, an electron tube [10] comprising (1) the transmission secondary electron emitter recited in claim 1, (2) an electron source (which includes photocathode [30]) for emitting the primary electrons to the transmission secondary electron emitter [30], (3) an anode [40] for collecting the secondary electrons emitted from the transmission secondary electron emitter [30], and (4) an envelope [20] for accommodating the transmission secondary electron emitter [30], the electron source [31], and the anode [40].

With respect to claim 10, Niigaki et al. discloses, in Fig. 7, that the electron source includes a photocathode [30] for emitting photoelectrons excited by incident light to be detected as the primary electrons.

With respect to claim 14, Niigaki et al. discloses, in Fig. 7, that the voltage applying means includes a first electrode (see col. 2, lines 28-29) formed on the side of the surface of the incidence of the secondary electron emitting layer [30], and a second electrode [40] formed on the side of the surface of the emission (see col. 7, lines 17-20).

3. Claims 1 and 9-13 are rejected under 35 U.S.C. 102(b) as being anticipated by Niigaki et al. (U.S. Patent No. 5,986,387).

With respect to claim 1, Niigaki et al. discloses, in Fig. 1, a transmission secondary electron emitter which emits secondary electrons [e-] generated by the incidence of primary electrons (which are emitted from a photocathode [18] by the incident of light is [hv]; see Fig. 1); the transmission secondary electron emitter comprising (1) a secondary electron emitting layer [18] which is made of diamond or a material containing diamond as a main component (see col.

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2, lines 11-12), and of which one surface is the surface of incidence for making the primary electron incident thereon, and the other surface is the surface of emission for emitting the secondary electrons (see Fig. 1), and (2) a voltage applying means for applying a predetermined voltage (which is a positive voltage; see col. 4, lines 35-39) between the surfaces of the incidence and the emission of the secondary electron emitting layer [18] to inherently form an electric field in the secondary electron emitting layer [18] (by force of the voltage applied).

With respect to claim 9, Niigaki et al. discloses, in Fig. 1, an electron tube [10] comprising (1) the transmission secondary electron emitter recited in claim 1, (2) an electron source (which includes photocathode [18]) for emitting the primary electrons to the transmission secondary electron emitter [18], (3) an anode [20] for collecting the secondary electrons emitted from the transmission secondary electron emitter [18], and (4) an envelope [12] for accommodating the transmission secondary electron emitter of claim 1, the electron source [18], and the anode [20].

With respect to claim 10, Niigaki et al. discloses, in Fig. 1, that the electron source includes a photocathode [18] for emitting photoelectrons excited by incident light to be detected as the primary electrons.

With respect to claim 11, Niigaki et al. discloses, in Fig. 1, that the electron source includes a photocathode [18] for emitting photoelectrons excited by incident light to be detected as the primary electrons, and the anode [20] has a fluorescent screen [22] (see col. 3, lines 57-60) emitting light by the incidence of the secondary electrons.

With respect to claim 12, Niigaki et al. discloses, in Fig. 1, that the electron source includes a field emission electron source [18], and the anode [20] has a fluorescent screen [22] (see col. 3, lines 57-60) emitting light by the incidence of the secondary electrons.

With respect to claim 13, Niigaki et al. discloses, in Figs. 1 and 9, that the electron source includes a field emission electron source array in which a plurality of field emission electron sources are arranged in an array (see Fig. 9), and the anode [20] has a fluorescent screen [22] (see col. 3, lines 57-60) emitting light by the incidence of the secondary electrons.

Citation of relevant prior art

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Prior art Sverdrup, Jr. et al. (U.S. Patent No. 6,060,839) discloses a thin diamond electron beam amplifier;

Prior art Sinor et al. (U.S. Patent No. 5,977,705) discloses a photocathode and an intensifier tube;

Prior art Niigaki et al. (U.S. Patent No. 5,959,400) discloses an electron tube; and

Prior art Lockwood (U.S. Patent No. 5,729,244) discloses a field emission device.

Remarks and conclusion

5. The "Replacement Sheets" of drawings were received on March 29, 2006. These drawings are accepted.

6. The new abstract of the disclosure submitted on March 29, 2006 is accepted.

7. The terminal disclaimer filed on 03/29/2006 remains pending due to the claims rejections over art.

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8. Applicants' arguments filed on March 29, 2006 have been fully considered but they are not persuasive.

With respect to Applicants' arguments at pages 10-12 concerning the rejections of claims 1-10, it appears that Applicants expect to distinguish the photocathode, the incident light, and the positive voltage with their corresponding functions of the cited reference to Niigaki et al. '094 from the features of the claimed invention, it is noted that the above cited features of Niigaki et al. '094 are clearly equivalent to those recited in the claims. The photocathode which is an electrode made of a thin film of diamond for emitting photoelectron(s) [e⁻] exited from a valence band to a conduction band (regarding "secondary electrons" as claimed; see col. 1, lines 48-49; col. 2, lines 28-30) can be defined as a secondary electron emitting layer. Photoelectrons, which are excited by the incident light [hv] on one surface of the photocathode, can be defined as the primary electrons. The positive voltage can be defined as a predetermined voltage. In addition to those above, Niigaki et al. '094 discloses a voltage applying means for applying a predetermined voltage (which is a positive voltage; see col. 7, lines 17-20) between the surfaces of the incidence and the emission of the secondary electron emitting layer [30] to inherently form an electric field in the secondary electron emitting layer (by force of the voltage applied). In a similar explanation, the cited reference to Niigaki et al. '387 discloses all of the claimed limitations as referred to in the rejections set forth above. In view of the foregoing:

- Claims 1-10 remain rejected and claim 14 is rejected as being anticipated by Niigaki et al. '094; and
- Claims 1 and 9-13 remain rejected as being anticipated by Niigaki et al. '387.

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9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Inquiry

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thuy V. Tran whose telephone number is (571) 272-1828. The examiner can normally be reached on M-F (8:00 AM -4:00 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy P. Callahan can be reached on (571) 272-1740. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR

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system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

06/07/2006

A handwritten signature in black ink, appearing to read 'Thuy V. Tran', written in a cursive style.

THUY V. TRAN
PRIMARY EXAMINER